

What is claimed is:

- 1 1. An at least partially purified DNA molecule comprising a sequence of
2 nucleotides that encodes an α_1 subunit of a mammalian T-type calcium channel.
- 1 2. The DNA molecule of claim 1, wherein the sequence of nucleotides is selected
2 from sequences of nucleotides encoding a protein including the sequence of amino acids set
3 forth in SEQ ID. No. 18, 20, 24, 26, 28, 31, 33, or 35 and sequences of nucleotides that
4 hybridize under conditions of medium hybridization stringency to DNA encoding a protein
5 including the sequence set forth in SEQ ID No. 18, 20, 24, 26, 28, 31, 33, 35.
- 1 3. The DNA molecule of Claim 1, wherein the calcium channel is a human
2 calcium channel.
- 1 4. The DNA molecule of claim 1, further comprising a promoter region effective
2 to promote expression of the α_1 subunit of a mammalian T-type calcium channel when the
3 DNA molecule is transfected into a vertebrate cell.
- 1 5. The DNA molecule of claim 1, having the sequence as set forth in Seq. ID. No.
2 23, 25 or 27.
- 1 6. The DNA molecule of claim 1, wherein the molecule comprises a region
2 consisting of the sequence as set forth in Seq. ID. No. 30, 32 or 34.
- 1 7. An at least partially purified α_1 subunit of a mammalian T-type calcium
2 channel.

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1 8. The α_1 subunit of claim 7, wherein the subunit has the sequence as set forth in
2 Seq. ID No. 24, 26 or 28 .

1 9. The α_1 subunit of claim 7, wherein the subunit comprises a region consisting
2 of the sequence as set forth in Seq. ID. No. 31, 33 or 35.

1 10. A eukaryotic cell transiently or stably transformed with the vertebrate
2 expression vector comprising a sequence of nucleotides that encodes an α_1 subunit of a
3 mammalian T-type calcium channel, wherein the cell expresses the α_1 subunit of a
4 mammalian T-type calcium channel.

1 11. The cell of claim 10, wherein the sequence of nucleotides is selected from
2 sequences of nucleotides encoding a protein including the sequence of amino acids set forth in
3 SEQ ID. No. 18, 20, 24, 26, 28, 31, 33, or 35, and sequences of nucleotides that hybridize
4 under conditions of medium hybridization stringency to DNA encoding a protein including
5 the sequence set forth in SEQ ID No. 18, 20, 24, 26, 28, 31, 33, or 35.

1 12. The cell of claim 10, wherein the calcium channel is a human calcium
2 channel.

1 13. The cell of claim 10, wherein the sequence of nucleotides has the sequence as
2 set forth in Seq. ID. No. 23, 25 or 27 .

1 14. The cell of claim 10, wherein the sequence of nucleotides comprises a region
2 consisting of the sequence as set forth in Seq. ID. No. 30, 32 or 34.

1 15. The cell of claim 10, wherein the sequence of nucleotides has the sequence as
2 set forth in Seq. ID. No. 27.

1 16. The cell of claim 10, wherein the cell is further transformed with and
2 expresses an $\alpha 2\delta$ or a β calcium channel subunit, or both.

1 17. A eukaryotic cell transiently or stably transformed with a heterologous DNA
2 fragment comprising a sequence of nucleotides that encodes an α_1 subunit of a mammalian T-
3 type calcium channel, wherein the cell expresses the α_1 subunit of a mammalian T-type
4 calcium channel.

1 18. The cell of claim 17, wherein the cell is further transformed with and
2 expresses an $\alpha 2\delta$ or a β calcium channel subunit, or both.

1 19. A method for the production of an α_1 subunit of a mammalian T-type calcium
2 channel comprising, culturing a cell transiently or stably transformed or transfected with DNA
3 encoding the calcium channel subunit under conditions such that the DNA is expressed and
4 the α_1 subunit is produced.

1 20. A process for producing a eukaryotic cell that is transiently or stably transformed
2 and expresses a mammalian T-type calcium channel, comprising the step of introducing RNA
3 or DNA encoding an α_1 subunit of a mammalian T-type calcium channel.

1 21. A method of identifying compounds capable of acting as agonists or antagonists
2 for T-type mammalian calcium channels, comprising contacting a recombinant cell expressing
3 a heterologous α_1 subunit of a mammalian T-type calcium channel, with an agent to be tested,
4 and evaluating the interaction, if any, between the agent to be tested and the calcium channel.

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1 22. An isolated DNA fragment having the sequence given by SEQ ID No. 19, 27
2 or 29.

1 23. A method for mapping the distribution of T-type calcium channels within a
2 tissue sample comprising the steps of exposing the tissue to a reagent comprising a directly-
3 or indirectly-detectable label coupled to a DNA fragment comprising a sequence selected
4 from among those sequences given by SEQ ID Nos. 13-17, 19, 23, 25, 27, 29, 30, 32 and 34,
5 and detecting reagent that has bound to the tissue.

1 24. A DNA fragment comprising a sequence of oligonucleotide that encodes a
2 calcium channel, wherein the sequence of nucleotides is selected from sequences of
3 nucleotides encoding a protein including the sequence of amino acids set forth in SEQ ID. No.
4 18, 20, 24, 26, 28, 31, 33, or 35, or a nucleotide sequence obtainable by subcloning a PCR
5 product of SEQ ID Nos: 13, 14, 15, or 16, labeling it by random hexamer priming, using the
6 primer to screen a commercial human brain cDNA library to produce partial sequence clones
7 containing overlapping cDNAs and ligating cDNAs obtained to produce full length cDNA
8 encoding a calcium channel protein.

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